

RANGE EXTENSIONS OF SIX WESTERN ATLANTIC
FROG CRABS (BRACHYURA: GYMNOPLEURA:
RANINIDAE) WITH NOTES ON THE TAXONOMIC
STATUS OF *LYREIDUS BAIRDII*

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Abstract.—Range extensions are given for 6 species of raninids that occur in the western Atlantic: *Ranilia muricata*, *Raninoides lamarcki*, *R. laevis*, *R. louisianensis*, *Symethis variolosa*, and *Lyreidus nitidus*, n. comb. Four of the new range records are extensions into or within the Gulf of Mexico with the remaining being the first records from South American waters. One form, *Raninoides louisianensis*, has previously been thought to be endemic to the Gulf of Mexico, but the many examples examined extend the known range south to Surinam. Intraspecific morphological variation is noted for each species and comparisons are made with specimens from well within the older established ranges to point out the extent of variation. The taxonomic status of *Raninoides nitidus* is reviewed and *L. bairdii* Smith is designated a junior synonym.

The family Raninidae has a pantropical distribution with 7 species now known to occur in the Gulf of Mexico. The crabs of this family are burrowing animals that possess a unique combination of characters usually regarded as both specialized for their mode of existence and the result of a hypothesized early divergence from the main line of brachyuran evolution (Bourne, 1922; Stevcic, 1974).

Specimens examined are from collections deposited in the U.S. National Museum of Natural History (USNM), the University of Miami Rosenstiel School of Marine and Atmospheric Science (UMML), and the Systematic Collection of Marine Organisms at Texas A&M (TAMU). I would like to acknowledge the kind assistance of Drs. Linda H. Pequegnat (TAMU) and Gilbert Voss (UMML), as well as Dr. Bowman and the staff of the Division of Crustacea, National Museum of Natural History. Dr. H. W. Levi (Museum of Comparative Zoology) graciously loaned type-material of *Raninoides nitidus*. This paper has greatly benefited from the criticisms of Drs. Richard W. Heard, Jr. (Gulf Coast Research Lab), and Darryl L. Felder (University of Southwestern Louisiana). Numerals which represent carapace lengths of specimens follow the specimen counts in each section under Material examined.

Ranilia muricata H. Milne-Edwards, 1837

Ranilia muricata H. Milne-Edwards, 1837:196. Rathbun, 1937:18. Williams, 1965:142. Costa, 1970:34.

Previous records.—North Carolina (Hay and Shore, 1918:420; Williams, 1965:142) to eastern Gulf of Mexico and Caribbean (Rathbun, 1937:18); 9–102 m.

Material examined.—TAMU 2-1262, 30 June 1962, N. W. Gulf of Mexico, 29°04'30"N, 94°16'W, 1 female, 33.7, 12 m.

Remarks.—The northwestern Gulf specimen closely agrees with H. Milne-Edwards' original description. It differs from eastern Gulf forms in that the ventral surface is more setose and in that the frontal margin of the carapace is not as strongly denticulate. Another female specimen (USNM 97667) was taken by Hulings (unpublished thesis, TCU 1955) from the Heald Bank (Sabine), Texas, but I did not examine the specimen.

The genus *Ranilia* was established in 1837 by Milne-Edwards with *muricata* as the type-species. Eight species are currently recognized, 4 of which occur in American waters. Correa (1970) listed a species from off Brazil and briefly compared it to *R. muricata*; the Brazilian species was described as *R. saldanhai* Costa, 1970. I have been unable to borrow specimens of *R. saldanhai*; until a detailed comparison between these two species is made the validity of *R. saldanhai* will remain uncertain.

Raninoides lamarcki A. Milne-Edwards & Bouvier, 1923

Raninoides laevis var. *lamarcki* A. Milne-Edwards & Bouvier, 1923:299.

Chopra, 1933:84. [Not *Raninoides laevis lamarcki* Boone, 1930:48.]

Raninoides lamarcki: Rathbun, 1937:13. Chace, 1940:5. Pequegnat, 1971: pl. 1.

Previous records.—Greater Antilles to Panama (Rathbun, 1937:13); 46–366 m.

Material examined.—TAMU 2-1983 (in part), 22 September 1971, SW Gulf of Mexico, 18°57'30"N, 95°34'30"W, 1 male, 39.0, 80 m; TAMU 2-2614 (in part) 10 July 1972, central western Gulf of Mexico, 23°29'N, 97°26'W, 1 female (ovig.), 23.5, 77 m; UMML, 32-3157, 14 July 1966, 9°59'N, 76°02'W.

Remarks.—These collections of *Raninoides lamarcki* are the first reported records of this species within the Gulf of Mexico. The Gulf specimens differ from Caribbean forms in that the Gulf specimens have (1) a larger number of teeth on the ventral surface of the propodus of the chelae, (2) the sixth sternal plate more rounded and less inflated posteriorly, and (3) differences in the orientation and relative development of terminal spines on the male pleopods.

Raninoides lamarcki is most closely related to *R. louisianensis* Rathbun. Although the frontal regions of the carapaces of the two species differ considerably in the development of the spines and the chelae differ in the number of spines, the two forms are very similar in many other respects. However, the male of *Raninoides louisianensis* has 4 spines on the end of the first pleopod, 1 small terminal spine at the apex and 3 well-developed sub-terminal spines surrounding the apex; whereas the male of *R. lamarcki* has the 4 spines of the pleopod similarly arranged but all well-developed.

Raninoides laevis (Latreille, 1825)

Ranina laevis Latreille, 1825:26.

Ranina laevis: H. Milne-Edwards, 1837:197.

Raninoides loevis: Rathbun, 1921:64; 1937:8. Chace, 1956:17. Correa, 1970:9.

Previous records.—Southeast of Cape Hatteras (Herbst, Williams and Booth 1979), west coast of Florida to north coast of South America, (Rathbun, 1937:9), off Tabasco, Mexico (Chace, 1956), Guianas to Bahia, Brazil (Correa, 1970:9); 18–186 m.

Material examined.—TAMU 2-0958, 29 June 1964, NW Gulf of Mexico, 28°30'N, 93°37'W, 2 male, 1 female (ovig.), 28.6–31.4, 42 m; TAMU 2-0959, 29 June 1964, NW Gulf of Mexico, 28°56'N, 94°35'W, 1 male, 2 females, 15.8–28.1, 26 m.

Remarks.—The western Gulf specimens differ little from the eastern Gulf forms and were compared to specimens collected from the Florida Middle Grounds. The 2 forms differed only in the shorter and stouter male pleopods and the broader, more rounded sixth sternite of the Texas specimens. No appreciable differences could be seen at the tip of the male pleopods or in the development of the chelae.

Other specimens labeled as *R. laevis* (USNM 97665, 97666, 96468) collected from the Heald Bank (Sabine), Texas, were not examined by the author. There appears to be a small population of this species in the western Gulf with a low concentration of individuals.

Recent workers (Guinot-Dumortier, 1959; Knight, 1968) note that the distribution of *R. laevis* as given by Rathbun (1937:9) is quite extensive, including records in the Pacific along the coasts of Panama and Colombia. Knight examined this problem and many of the Pacific specimens that Rathbun had identified as *R. laevis*. Her conclusions agree with Guinot-Dumortier (op. cit.) in that some of the characters used to differentiate *R. laevis* from *R. benedicti* are not valid in smaller individuals. Knight used the first male pleopods to separate the species and concluded that all of the specimens from the Pacific coast of Panama should be referred to as *R. benedicti* and that *R. laevis* is probably restricted to the Atlantic and Gulf waters.

Raninoides louisianensis Rathbun, 1933

Raninoides louisianensis Rathbun, 1933:186; 1937:12. Chace, 1940:5; 1956:17. Leary, 1967:30. Pequegnat, 1970:81; 1971:pl. 1.

Previous records.—East of Mississippi Delta (Rathbun, 1937:12) to Campeche Banks (Chace, 1956); 55 to possibly 677 m.

Material examined.—USNM 121658, 27 May 1964, Colombia, 07°50.5'N, 76°53.5'W, 1 male 58.0, 73 m; USNM 121659, Gulf of Venezuela, 11°58.1'N, 81°26.3'W, 12 males, 9 females (2 ovig.), 20.8–71.2, 109–295 m; UMMML 32:2642, February 1963, Surinam, 08°01'N, 54°21'W, 1 male, 1 female (ovig.), 29.6–49.3.

Remarks.—The Surinam specimens examined represent new southern range extensions for *R. louisianensis* which had been considered an endemic to the Gulf by previous workers (Pequegnat, 1970, 1971). It has also never been reported from the southeastern region of the Gulf. The many specimens collected from the Caribbean and off Surinam do not differ greatly from individuals in the Gulf of Mexico, apart from many being considerably larger in carapace lengths. In comparing the Surinam individuals with Gulf specimens, no obvious differences were noted in the pleopods of males or spermathecal pits of the females. The frontal spines, chelae, and ambulatory legs of the Surinam specimens all closely match the original description of the animal.

In discussing the bathymetric distribution of *R. louisianensis* in the Gulf of Mexico, Pequegnat (1970) pointed out that the two deep-water records by the Oregon (366 m and 402 m) may be due to animals not picked out of the trawl from previous shallower stations where *R. louisianensis* would probably be found. While this may be, specimens from 677 m have since been collected in the western Gulf (TAMU 2-2615), surpassing the previous questionable depths. However, this record may show either a broader bathymetric range than previously recognized, or contamination of the sampling gear from shallower stations.

Symethis variolosa (Fabricius, 1793)

Hippa variolosa Fabricius, 1793:476.

Symethis variolosa: Weber, 1795:92. Rathbun, 1937:26. Cerame-Vivas and Gray, 1966:263. Correa, 1970:10.

Eryon trilobatus de Freminville, no date (Fide Rathbun, 1937).

Zanclifer caribensis de Freminville, 1832:275, Henderson, 1888:34. Bourne, 1922:66.

Previous records.—Florida to Bahia, Brazil and Panama (Pacific) (Rathbun, 1937:26), North Carolina (Cerame-Vivas and Gray, 1966:263); 18–137 m.

Material examined.—TAMU 2-2243, western Gulf of Mexico, Isla de Lobos, 21°27'N, 97°14'W, 8 October 1972, 1 male, 14.5, 7.6 m.

Remarks.—The western Gulf specimen was compared with specimens collected off the west coast of Florida and differed in the following respects: carapace slightly less eroded and granulated than the eastern Gulf forms, palm of cheliped smoother, chelae not as bulky and pleopod of the male specimen less massive than Florida specimens. However, many of these differences may be attributable to the immaturity of the western Gulf specimen.

This constitutes the first published record of *S. variolosa* from the western Gulf. This species appears to occur rarely even within its previously established range and is restricted to broken shell substrates.

The geographic distribution of this species, as given by Rathbun (1937:26), includes the Pacific coast of Panama. The Pacific record was based on a single female specimen collected by the Hancock Galapagos Expedition at Bahia Honda, Panama in 1934. The USNM also has in its holdings a second lot of this species, collected from Puerto Refugio, Baja California, Mexico in April 1939 from a depth of 27 m. I have examined these specimens and conclude that they represent an undescribed species. The *Symethis* form in the eastern Pacific closely resembles the Atlantic form and will be described in a forthcoming paper.

Lyreidus nitidus (A. Milne-Edwards, 1880) n. comb.

Raninoides nitidus A. Milne-Edwards, 1880:34. A. Milne-Edwards and Bouvier, 1923:298. Rathbun, 1937:17. Serene and Umali, 1972:36.

Lyreidus bairdii Smith, 1881:420. Rathbun, 1937:23. Chace, 1940:6. Leary, 1967:30. Pequegnat, 1970:180; 1971:pl. 1.

Previous records.—Martha's Vineyard (Smith, 1881:420), Gulf of Mexico and Greater Antilles (Rathbun, 1937:23 and Pequegnat, 1970:180); 119–823 m.

Material examined.—Type male, MCZ 10762, Grenada, British West Indies, Blake Station 259, 288 m; USNM 78626, off Tortugas, Florida, 2 females (1 ovig.); USNM 136821, 24 March 1963, "Oregon" Station 4302 off Surinam, NE of Paramaribo, 07°35'N, 54°W, 2 males, 4 females, 21.5–31.5, 457 m; USNM 121651, 10 October 1963, "Oregon" Station 4447, north coast of Venezuela, off Puerto Cabello, 10°52'N, 67°56'W, 1 juv., 14.0, 366 m.

Remarks.—This record extends the known range of the species southward to the north coast of Surinam. The specimen from Venezuela is atypical in that the extraorbital spines are more pronounced than the rostral spine. The frontal spines of *L. nitidus* from the Gulf of Mexico are normally equal in length. This variation is attributable to the small size of the specimen.

Lyreidus nitidus is the only known Atlantic representative of the genus; all other described species are from the Indo-West Pacific region. *Lyreidus nitidus* occurs in relatively deep waters over most of its range and may be the most abundant raninid in the Gulf of Mexico (Pequegnat, 1970). The bathymetric range of this species extends to at least 823 m, which gives *Lyreidus nitidus* the deepest range of all the American frog crabs. In his revision of the genus *Lyreidus* DeHaan, Griffin (1970) recognizes only 5 of the 11 previously named species as valid; he considers the remaining 6 species as junior synonyms of these 5. Although he continues to recognize *Lyreidus bairdii* (= *Raninoides nitidus*) as a valid species, his comparative studies of male pleopods suggest that this species is closely related to *Lyreidus channeri* Wood-Mason from the Indo-West Pacific.

The taxonomic status of *Raninoides nitidus* has been uncertain. No specimens other than the type male have been available for study. This species, however, has been considered a part of the western Atlantic fauna. *Raninoides nitidus* was described from a single male specimen collected by the Blake (Station 259) off Grenada, British West Indies from 288 m. No additional collections have been reported in the literature. Rathbun (1937) included this species in her account of the oxystomatous crabs of America but had no specimens available for examination. She reproduced Milne-Edwards' and Bouvier's (1923) figure of the animal and reported that the type was "not located." However, the type-specimen was located at the Museum of Comparative Zoology during this study.

Specimens of *R. nitidus* examined for this study consisted of the type male (MCZ 10762), a second male (USNM 78626) and 2 females (1 ovig.) (USNM 78365), the latter 3 specimens identified by W. L. Schmitt. These specimens were collected in 1932 and 1939, respectively, from 244 to 283 m off Tortugas, Florida. A close examination of the type male and the above specimens has shown that *Lyreidus bairdii* Smith (1881) must be considered synonymous with *Raninoides nitidus* A. Milne-Edwards. Since Milne-Edwards' description has priority over Smith's publication, *L. bairdii* must be designated the junior synonym.

The type-specimen, the original description (A. Milne-Edwards, 1880) and figure (A. Milne-Edwards and Bouvier, 1923) of *Raninoides nitidus* all agree very well with Smith's (1881) description of *Lyreidus bairdii*, with only a slight discrepancy in the illustration. In the figure, the fronto-orbital region is more than half the greatest carapace width when normally it is less than half. However, the type male is immature (8 mm) and in young specimens the relative width of the frontal region is much greater than in mature individuals. The type of *Raninoides nitidus* also has a well-developed tooth between the posterolateral spine and the extra-orbital spine. This agrees with Smith's description of a "spinule" at this location for the type of *L. bairdii* (USNM 21363). Gulf of Mexico specimens often differ from this with the tooth reduced to a lump along the anterolateral margin.

Lyreidus bairdii was described from 183 m off Martha's Vineyard and has since been reported numerous times from Massachusetts to Puerto Rico (Rathbun, 1937:21) and all parts of the Gulf of Mexico (Leary, 1967:30; Pequegnat, 1970:180). Pequegnat (1970) noted that this species is common in deeper waters and gave figures which estimated the population density as it varies with depth. He called *L. bairdii* the most abundant raninid in the Gulf of Mexico.

Raninoides nitidus readily conforms to the generic description of *Lyreidus* De Haan as given by Griffin (1970), and agrees in all of the following characters: fronto-orbital width less than one-half greatest carapace width, eye-stalks stout and cornea small, antennal peduncle stout, not covering antennular peduncles, merus of third maxilliped slightly longer than ischium, shape of sternum, as well as cheliped and pereopod forms. For these reasons *Raninoides nitidus* is hereby transferred to the genus *Lyreidus* and designated *Lyreidus nitidus* (A. Milne-Edwards, 1880) n. comb.

Several workers (Henderson, 1888, Chopra, 1933 and Serene and Umali, 1972) had noted that *R. nitidus* is an aberrant member of the genus *Raninoides* because of the presence of two lateral spines behind the extra-orbital teeth. Serene and Umali (1972) suggested that *Lyreidus channeri* and *Lyreidus nitidus* may belong to a new genus intermediate between *Lyreidus* and *Raninoides*. They noted that *L. channeri* also differs from the other Indo-West Pacific members of the genus *Lyreidus* by the presence of the two lateral spines posterior to the extra-orbital spines as well as short, stout eye peduncles and other characteristics.

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